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# The Socio Economic Effects of Community Forest Management: Evidence from Dendi District, Ethiopia

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## Abstract

The system of community forest management (participatory forest management) seeks to initiate the process of eliminating the main causes of forest depletion through participation of local communities. In this paper we have attempted to analyze the participatory forest management in Dendi District of Oromia region through households' socio-economic and forest conservation lenses.

The findings of the study reported that participatory forest management enhanced the livelihood, the conservation measurements and the social assets of the local communities. It was found that this regime of forest management could attain the sustainability of the forest and accelerate the standard of participant household's livelihood; hence, the program is an efficient management option towards sustainability of the forest resources.

**Key words:** Participatory forest management, Community forestry, Livelihood, Rehabilitation of degraded forest, Sustainable development

## Acronyms

FUG Forest User Group  
 PFM Participatory Forest Management  
 SNNP Southern Nations and Nationalities People

## 1. Introduction

Hundred years ago, about 40% of land was covered by forest in Ethiopia whereas only less than 3% of the land is covered by forest currently (Bedru, 2007). The proportion of lost forest cover is almost the same with the size of the Northern European country, Sweden. The major reason behind degradation of forests is human interference (such as expansion of agricultural land, grazing, firewood) and poverty (Bedru, 2007).

In addition to the above factors, the forest management administration over the last 50 years in Ethiopia has negatively affected the forest resource by restricting local communities' access and user rights. After 1941, Emperor Haile Selassie declared a law to privatize land and limit access to forestland. This proclamation was in operation until the Derg regime came to power. In 1975, the Derg regime came into power with a new proclamation, nationalizing lands and putting administration of land under highly centralized system. The new rule, which is a proclamation on regulation, by Derg resulted into open access to the resource. The proclamations in the two regimes did not save the country forest resources from degradation as majority of the lost forests were destroyed in this period. In 1991, the fall of the Derg regime further devastated the environment and a new government, Ethiopian People's Revolutionary Democratic Front, came to power. In 1994, the new government issued a new proclamation, which was unimplemented because of the subsequent decentralization programme (Abebe et al, 2009; Bedru, 2007; Gebremdhin, 2008).

The Lesser-control over the encroachers, defective forest guarding system deteriorated the effectiveness of the prior forest management scheme. In order to meet the situation, the management reformed to participatory management by involving the encroachers and local poor. There has been no participation of the local people in forest management before. However, the objective of implementing participatory management was sustainability of resources as well as resettling the encroachers as protector of the forest along with better livelihood (Sarin, M., 2002; Wade, R., 1987; Kant S., 2000; Agarwal, B., (2001).

Due to the relatively better coverage of forest in Oromia and South Nations Nationalities People Regional states, they have pioneered the establishment of this new management initiative system (decentralized forest management approach). Moreover, now the programme is scaled up for implementation in the other

regional states too, for example in Tigray region the project started its operation since 2010.

International Non-Governmental Organizations (NGOs) such as the German Technical Cooperation (GTZ), FARM Africa and SOS Sahel Ethiopia are implementing the community based forest programmes in collaboration with the national regional governments Oromya and SNNP. The FARM/SOS Participatory Forest Management (PFM) programme has been operational in Ethiopia since 2002 in the forest of Bonga, Chilimo (Dendi District), Borana and Bale in Oromya region.

The introduction of decentralized forest management programme is with the general objective of controlling forest degradation and achieving conservation of biodiversity on the one hand, and empowering communities to participate and improve their living condition on the other hand. This research project was conceived with a view to examine the outcomes of Participatory/community Forest Management (PFM) in terms of socio-economic variables and conservation results in the case of Dendi district, Ethiopia.

## **2. Materials and methods**

Three forest rich villages such as Chilimo, Mesalemiya and Kersa were selected purposively because these villages are among those villages of Dendi District having maximum forest cover. The technique of comparing control versus experimental group was adopted for impact assessment of the PFM project. The experimental group for this paper was defined as those participating in the project where the participatory forest management approach had been implemented under Farm SOS; the village level institutions had been created for carrying out forest management and development activities. The control group was composed of the non participants of the project. We used proportional stratified random sampling for selecting sample respondents where the proportion of project members and non members was used to determine the number of samples from each village. Quantitative data were obtained through structured questionnaire from randomly selected PFM member and non member households in each village. 100 respondents from PFM participant (52, 41 and 7 respondents from Chilimo, Mesalemiya and Kersa respectively) and 150 respondents from non members (35, 55 and 60 and respondents from Chilimo, Mesalemiya and Kersa respectively) were interviewed.

Comparison tests were used to assess the impact of participation on livelihood status of households, in terms of the differences between the 'with' and 'without' program situations. Statistical tests were applied for differences in socio-economic characteristics of the respondents.

The Kolmogorov-Smirnov one-sample test was applied to check the normality assumption of the distributions of sampled variables. The statistics showed for some variables a drastic departure from the normality assumption, which led to use of non-parametric comparison tests. The Kolmogorov-Smirnov Z nonparametric test (for two independent samples) has been used for determining differences between the 'with' and 'without' program situations. An independent t-test was applied to depict annual income differences between the two groups as income distribution maintains the normality assumption.

The qualitative data were also collected to explicate the quantitative data and to obtain the holistic understanding. Key informants and focus group interviews were included to acquire qualitative data. The data from qualitative interviews consist of direct quotations from people about their experiences, opinions, feelings and knowledge.

## **3. Results and Discussions**

### **3.1 Livelihood strategies**

The term livelihood strategies is used to denote the diversity of activities and choices that people make/undertake in order to achieve their livelihood objectives (including productive activities, investment strategies, reproductive choices, etc.). The diversification and flexibility that people have in their livelihood strategies, the greater their ability to withstand – or adapt to – the shocks and stresses of the vulnerability context (Krantz, L, 2001).

The relevant data regarding the cash oriented livelihood strategies are given on [Figure 1](#). Most PFM participant/project member respondents reported that forests, livestock, small business and farming were their main sources of income. Most non member respondents, on the other hand, reported that daily wage/labor and small business were their main sources of income.

The overall results regarding the livelihood strategies indicated that majority of project members were dependent on the natural resource (forest, land, etc.) for their cash income; while non member respondents had adopted diverse non-natural resource based activities such as labor, small business etc. The qualitative

interviews regarding forest use patterns also revealed that the majority of the respondents were dependent on forest wood for their household needs (for example wood for house construction/repair, fuel wood, fodder and pastures for livestock etc.). It can therefore be argued that the forest resources contributed the subsistence (or non-cash) oriented livelihood strategies of the local people. In the context of institutional changes, besides an emphasis on forest conservation, Farm SOS had also contributed towards the enhancement of cash oriented livelihood strategies, for instance, through creating the institutional framework for credit access to the participant/ project member households.

### 3.2 Access to loan

There was large number of respondents who received loans for their household needs. Those respondents, who received loan, were asked about the sources of the loan. The data pertaining to their responses are shown on Figure 2. Friends and relatives were the most important sources of loan (cash) as evident on Figure 2. There were very few (less than 10%) respondents who took loan from banks (Figure 2). The most important source of loans for households participating in community forest management includes loans from their relatives, friends, FUG cooperatives and Iqqub<sup>1</sup>. It can be concluded from the results of the study that relative and friends were the sources of loan for a number of PFM participants as compared to the non participants, which indicate the increased level of social capital of the project member residents.

During qualitative interviews the respondents reported increased interaction with their fellow villagers. Some of the typical qualitative remarks were; “A periodical meeting is held where people come from various hamlets of each village and openly talk about our problems”, one of a project member told.

“..... now the people have more chances of interaction not only with one another but also with the government officials as well. Moreover, we frankly discuss our personal as well as village problems”, a farmer of a project member told.

The above statements indicated that the institutions created as an outcome of participatory approach has provided a new forum to the project members and enhanced their social capital.

### 3.3 Yearly Family Expenditure

Yearly household expenditure was grouped according to food, beverages, fuel, clothing, medical care, education and other expenses (Table 1). The highest proportion of the income is spent on food, as a basic necessity of daily life. PFM participant households and non participant groups spent the second highest proportion of their income on clothing. The average food expenditure is higher in the PFM participant household group than the non participant. The yearly total household expenditure (sum of mean expenditure for each item) is 45,334 birr.

A non parametric test, Kruskal-Wallis, shows (at the 1% level) that expenditure on food, fuel and clothing differs significantly between community forest management participants and non participant groups (Table 2). Mean expenditure on beverage and social activities differs between groups at the 5% significance level.

### 3.4 Yearly Family Income

The study applied t-statistic to compare whether there is a significant difference between the income levels of PFM participants and non participant groups of the rural population in Dendi district. The test result revealed that there were significant differences on income levels of households who were participants in community forest management against the households who were not participants.

From the fact that the average income level for PFM participant households was greater than the averages of non participant, it can be concluded that participating in PFM has an impact on income level. In this case PFM participant households evidenced a better level of livelihood status in terms of income than non participant neighbors. Hence, participation in community forestry improves the income level of households, which the test result shows that PFM participation has a significant (1% level) effect on annual household income.

### 3.5 Summary on the differences in socio economic characteristics of PFM participant and non-participant households

In order to detect differences in socio economic characteristics of PFM participant and non-participant

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<sup>1</sup> Ethiopian traditional saving and credit scheme

households, the Kolmogorov-Smirnov Z (two-independent nonparametric sample test) was carried out. The Kolmogorov-Smirnov Z (two-independent nonparametric sample test) was used for testing mean differences. The variables considered are age, education, family size, annual income, and yearly expenditure. Between PFM participant and non-participant households the mean years of education, and annual income are significantly asymptotically different between the groups at 1% level. Moreover, yearly expenditure and household size are significantly asymptotically different between the groups at 5% and 10% level respectively (Table 3). This indicates membership in community forest management may affect the households' livelihood in the study area.

#### 3.6 Perceptions on the ecological effects of PFM

A query was made to examine the change in few conservation factors such as forest cover, fuel wood, soil erosion and wildlife. Table 4 shows the change in conservation factors. Most of the participants (93%) opined that forest cover was increased in terms of replanting that helped to reduce encroachment of natural. 88% of the non-participants agreed that forest cover increased, too. In case of fuel wood both groups gave almost same opinion. Overall comment on soil erosion was replanting activities helped to reduce soil erosion by increasing vegetative cover. Most of the participants agreed that wildlife also changed due to plantation activities whereas a few of them disagreed with the opinion.

#### 4. Discussion

The results indicate that a considerable difference was found in the sources of income and livelihood strategies of the respondents of community forest participants' vis-à-vis non-participant groups. The results also revealed that major cash oriented livelihood strategies of the respondents were dependent on the natural resources for their cash income. Moreover, forest resources contributed significantly towards the subsistence (non-cash) oriented livelihoods of the respondents (for example forest wood for cooking/heating and construction purposes, fodder/pastures for livestock, etc.). It can be argued, therefore, that the improvement of the forests cover, which is one of the main objectives of PFM, as an outcome of the institutional changes can ensure the partial livelihood security of the local people in the future (Ali, T and Shahbaz, B., 2000; Chhetri, K., 2005).

The qualitative interviews (key informants and focus group) were taken to know the perceptions of the project members regarding participatory forest management system. Some of the excerpts from the qualitative data are given as under;

The president of FUG cooperative union explained, "(.....) After Farm/SOS introduced this institutional change, our livelihood have been improved. We sell part of the forest, which is our main source of cash income. In addition, we work on regeneration of new trees and sell part of them to the market. But in place of the deforested trees for sale, we work on regeneration of new trees and a forestation on uncovered areas ahead of time. One of a project member reported, "We are motivated to work on the protection of our forest as the forest is our important source of income". Therefore, the stress on financial benefits for project members had higher implication on the participatory forest management system mission of forest protection and regeneration.

The above statements indicate that the emphasis given on the enhancement of the financial assets of the project members was the driving factor for better forest protection and forest regeneration in the area. The objectives (forest protection) of participatory forestry project and the effectiveness of the institutional change were attained as the livelihood objectives (more income, food security) of project members have given special attention. However, Ali et al. (2001), while discussing the effectiveness of participatory forest management system in Pakistan explained that the incompatibility between the objectives of participatory forestry project and the livelihood objectives of the local people was one of the factors hindering the effectiveness of the institutional change process.

The access to loan for more number of the respondents of project members was through relatives, friends, FUG cooperatives and Iqub relatives and friends. The qualitative data revealed the enhancement in the social capital of the respondents of project members through increased interactions and communication with their fellow villagers, and other tribes.

The Kolmogorov-Smirnov Z (two-independent nonparametric sample test) has revealed that annual expenditure, is significantly asymptotically different between the PFM participant and non participant groups at 5% level. Moreover, the t-test showed that yearly annual income is different between the groups

at 1% level. This indicates membership in community forest management may affect the households' livelihood in the study area.

The query made to examine the change in conservation factors depicted that most of the participant and non participants agreed that forest cover, fuel wood, soil erosion and wildlife status have been improved due to plantation and conservation activities after PFM have been commenced.

### **5. Conclusion, lessons learned**

In this paper we examined the role of participatory forest management scheme in Dendi district of Oromya region, Ethiopia.

Participatory forest management has had a positive contribution on improving households' livelihoods as well as on sustainability of the forest resource. According to the statistical tests, participatory forest management has had a positive impact on the livelihood of households. The results also indicated that participatory forest management brought a significant change in the social assets of the local communities as well as conservation measurement. It was found that the participatory management regime could attain the sustainability of the forest and accelerate the standard of PFM project member household's livelihood; hence, the program is an efficient management option towards sustainability of the forest resources. These findings suggest that there is a role for extending the approach to rehabilitate and protect forest resources in other parts of the country as well.

The following four lessons may be learnt from the study:

- The existence of incentives motivates project members in forest protection. Some economic incentives (either in the form of cash or noncash) should be provided to the project members to motivate them in forest protection/conservation in areas where participatory forest management projects are implementing.
- The finding that the impacts of participatory forest management on most of the indicators of financial assets were significant; this can be explicated as the project has given priorities on financial security. Hence, a lesson that can be learnt from the experiences of PFM project in Dendi district is that successful PFM require a holistic analysis of the livelihoods assets (particularly financial assets) and livelihood strategies of local people should be undertaken before implementation.
- Integration of the natural resource management schemes with other livelihood interventions, such as microcredit, infrastructure development etc. can enhance the effectiveness of such interventions.
- It should be noted that the success came to exist since the need of the community was assessed and considered as part of the project initiative and people were put at the center of development.

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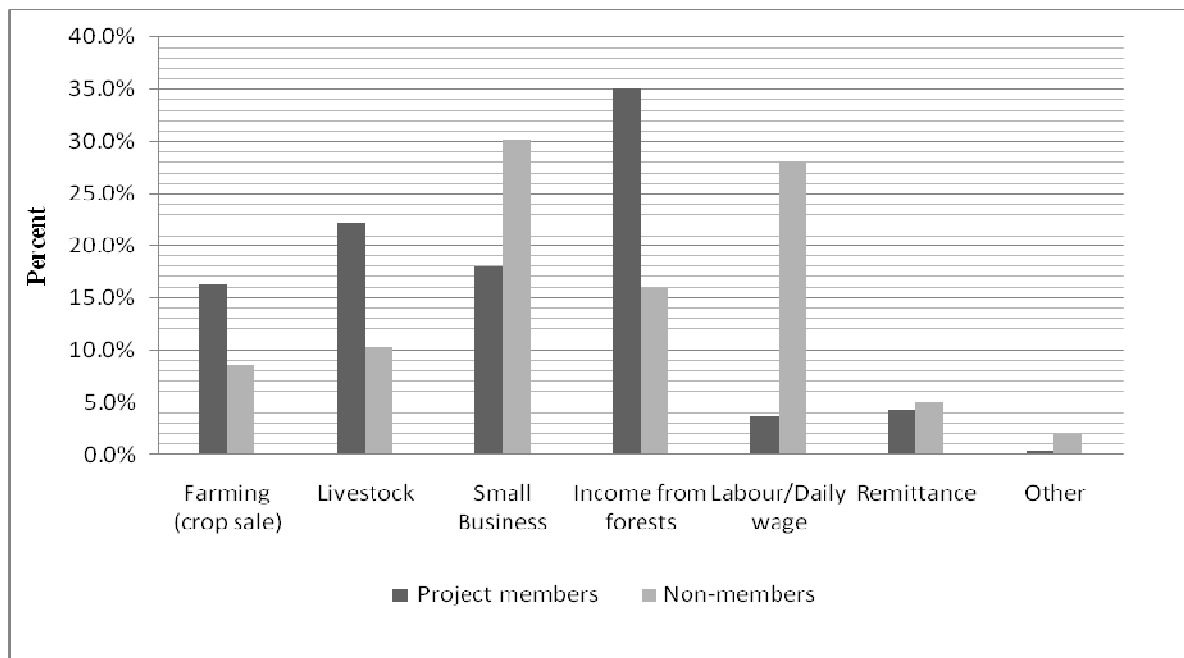
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**Figure 1 Livelihood strategies**

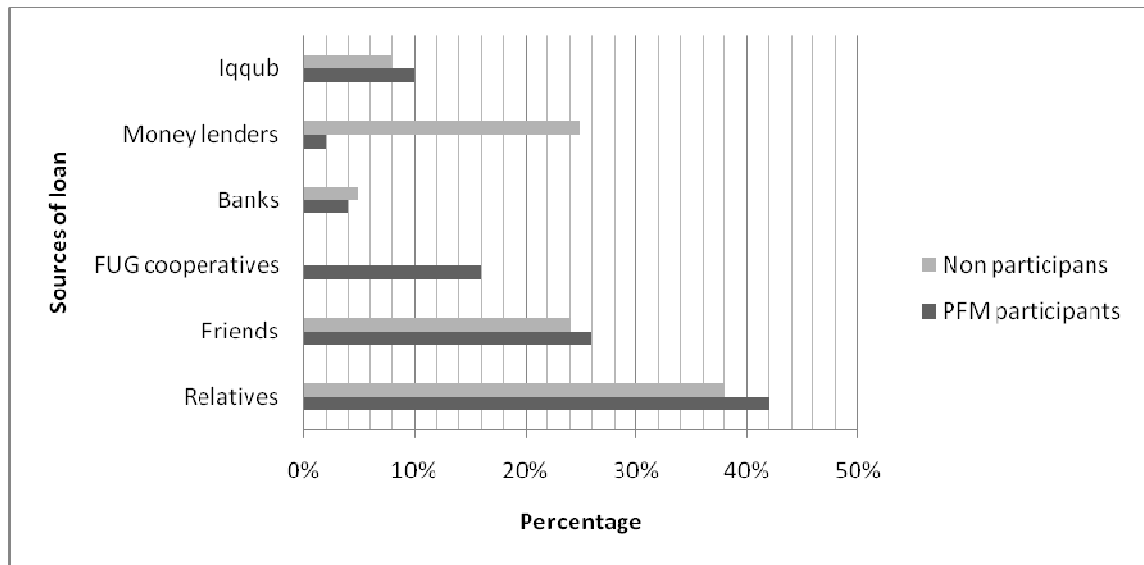


Figure 2: Sources of loan for PFM participant and non participant households

Table1: Mean yearly household expenditure by expenditure item

Expenditure item	PFM participant	non-Participant	Totals by means
	Mean (Birr)	Mean (Birr)	
Food	12,454	15,790	28,245
Beverage	1,199	1,521	2,720
Fuel	691	876	1,567
Clothing	1,999	2,535	4,534
Medical care	470	596	1,065
Education	735	932	1,667
Construction	1,179	1,495	2,675
Travel	760	963	1,723
Social	600	760	1,360
<b>Total</b>	<b>19,991</b>	<b>25,345.50</b>	<b>45,337</b>



**Table 2: The difference on expenditure categories between community forest management participants and non participant groups**

Expenditure item	Ci-square statistic	p-value
Food	19.5	0.000**
Beverage	6.23	0.031*
Fuel	10.12	0.000**
Clothing	13.45	0.000**
Medical care	2.34	0.321
Education	3.17	0.263
Construction	1.33	0.351
Travel	1.21	0.397
Social	7.56	0.024*

\* Significant at 5% level; \*\* significant at 1% level

**Table 3. Kolmogorov-Smirnov Z for the mean difference of socio economic variables between PFM participants and non participant households**

Variable	Kolmogorov-Smirnov Z	Asymptotic Significance (2-tailed tests)
Age(years)	0.1477	0.19
Education(years)	0.332	0.000 **
Family Size(number)	0.1635	0.084
Annual Income(Birr)	0.7404	0.000**
Yearly expenditure(Birr)	0.243	0.023*

\* Significant at 5% level; \*\* significant at 1% level

**Table 4. The change in conservation measurement due to participatory forest management**

Status	Forest cover		Fuel wood		Soil erosion		Wildlife	
	PFM Project Members	Non member	Project Members	Non members	Project Members	Non members	Project Members	Non members
Increasing	93%	88%	75%	85%	8%	10%	87%	71%
Decreasing	2%	7%	5%	3%	74%	71%	5%	19%
No change	3%	5%	20%	10%	12%	8%	6%	9%
No answer	2%	0%	0%	2%	5%	11%	2%	1%



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